

BLOOD GLUCOSE MONITOR ELIMINATES PAINFUL TESTING

Roughly 15 million people in the United States suffer from diabetes.⁴ In the realm of diseases, it is the third biggest killer and can lead to blindness, kidney failure, cardiovascular disease, and serious infection.

Therefore, it is essential for diabetics to maintain good health, which often requires them to take insulin every day. Today, about 2.5 million patients must carefully monitor blood glucose levels to determine the efficacy of the insulin. Unfortunately, current technology dictates that diabetics stick their fingers with a needle a few times each day to test their blood. This process is both

painful and expensive—roughly \$800 million is spent on home glucose kits each year.⁵

As a noninvasive, needle-free alternative, Rio Grande Medical Technologies, Inc. (Albuquerque, NM), is developing a glucose monitor that reads blood glucose levels using spectral analysis of a near-infrared (IR) beam. This innovation presents a painless and waste-free way to monitor blood glucose levels. If the cost and size can be

reduced this technology may well extend glucose monitoring services to many more diabetics with less stringent insulin requirements.

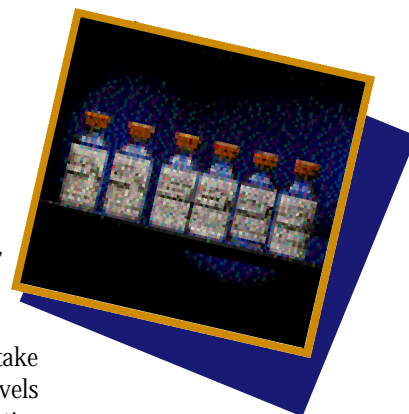
The portable blood analyzer can also be used in law enforcement and emergency medicine, and for critical care patients and those undergoing general anesthesia. Forward medical care on the battlefield may be another use.

Rio Grande was founded expressly to commercialize this technology, collaborating extensively with Sandia National Laboratories, or SNL (Albuquerque, NM), and the University of New Mexico School of Medicine. BMDO-sponsored research at SNL led to the multivariate analysis software used in the monitor's spectral analyzer—R&D originally designed for space-based imaging and nondestructive analysis.

Rio Grande is aggressively pursuing the technology development and product engineering with strong contributions from a large U.S. health care company and funding from the Advanced Research Projects Agency Technology Reinvestment Project. One of the challenges now is to reduce the size of the monitor.

ABOUT THE TECHNOLOGY

To operate the blood monitor, a near-IR light beam is passed through the finger, and the spectral components of the emergent beam are measured using statistical computing and spectroscopic techniques. The level of glucose is determined by how much light at a particular wavelength is absorbed by the glucose compared with how much light strikes the photodetector. The monitor is nearly as accurate as present systems, which rely on visual or digital reading of color-coded strips compared with a blood sample. It eliminates finger-sticking, and can also provide a way to quickly examine trends in blood glucose levels. Near-IR spectral analyzers can also be used to determine blood alcohol levels, as well as carbon dioxide, bicarbonate ion, and oxygen content of the blood.



Roughly 2.5 million patients must monitor blood glucose levels to determine the efficacy of the insulin, daily sticking their fingers with a needle to test blood. Rio Grande Medical Technologies' device offers a noninvasive approach to this testing.



Rio Grande was founded expressly to commercialize this technology. Pictured above is the device, which uses spectral analysis of a near infrared beam.

⁴Draft Testimony to House Subcommittees on Basic Research and Technology, Tom Fortin; Rio Grande Medical Technologies, Inc., presented June 27, 1995.

⁵Infrared Technology May Aid Diabetics, *Aviation Week & Space Technology*, August 23, 1993, p. 65.